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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/610,188	07/05/2000	Jon C. Taenzer	022577-590	5001

7590 06/23/2005

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EXAMINER

PENDLETON, BRIAN T

ART UNIT PAPER NUMBER

2644

DATE MAILED: 06/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/610,188	Applicant(s) TAENZER ET AL.	
	Examiner Brian T. Pendleton	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks, filed 1/28/05, with respect to the rejection(s) of claim(s) 1-35 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sessler et al, US Patent 3,715,500, Bartlett et al, US Patent 5,473,684 and Miller, II, US Patent 5,029,215.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Sessler.

Sessler discloses a directional microphone comprising transducer 20, cavities 15, 16, tubes 10-13, delay element 30 and summer 31. Tubes 10 and 12 and transducer 20 represent one first-order microphone element, tubes 11 and 13 and transducer 20 represent another first-order microphone element. Delay element 30 and summer 31 represent a combining unit to generate a second order microphone system. The finite delay ratio is greater than one for the first order microphone elements because there is an inequality between length between the sound inlet port of tube 10 and the transducer 20 and the length between the sound inlet port of tube 12 and the transducer 20.

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Claims 28, 29, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Miller, II, US Patent 5,029,215. Miller discloses an automatic calibrating apparatus for a second order microphone system comprising first order microphones 201, 202, speaker 203, and microprocessor 412.

Claims 28, 32-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Bartlett et al, US Patent 5,473,684. Bartlett discloses a noise canceling differential microphone assembly comprising first order microphone elements 30 and 32, adaptive filter 125 and processor 120 in figure 6.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler in view of Allen et al. Sessler does not disclose that the microphone elements are omnidirectional microphones (which have no nulls). Allen et al disclose a directional microphone in figure 1 comprising four omnidirectional microphones P1, S1, P2, S2 with a delay element τ coupled to two of the omnidirectional microphones. Thus, it was taught in the art to use omnidirectional microphones in second order microphone systems. It would have been obvious to one of ordinary skill in the art at the time of invention to use omnidirectional microphone elements, as taught by Allen et al, in the apparatus of Sessler for the purpose of constructing a second order microphone system using conventional microphone elements.

Claims 2-3, 6-8, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler et al in view of Killion et al. Sessler does not disclose that the microphone system is

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used on a human head. Nevertheless, it was well known to use directional microphone systems on the human head, as hearing aids, for example, as evidenced by Killion et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the apparatus of Sessler in a hearing aid apparatus for the purpose of improving the listening capabilities and noise reduction for the user. Per claims 6 and 7, one of ordinary skill in the art would have realized the claimed delay ratio range without undue experimentation in the pursuit of the optimal microphone system for a particular application. As to claim 8, Killion et al disclose a delay and subtraction technique for combining microphone signals, which was well known in the art of beamforming at the time of invention.

Claims 20, 21, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler et al in view of Allen et al as applied to claim 14 above, and further in view of Killion et al. The combination of Sessler and Allen does not disclose that the microphone system is part of a communication system or used on the human head. Nevertheless, it was well known to use directional microphone systems on the human head, as hearing aids (which are communication systems), for example, as evidenced by Killion et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the combination of Sessler and Allen in a hearing aid apparatus for the purpose of improving the listening capabilities and noise reduction for the user. Per claims 15 and 16, one of ordinary skill in the art would have realized the claimed delay ratio range without undue experimentation in the pursuit of the optimal microphone system for a particular application. As to claim 17, Killion et al disclose a delay and subtraction technique for combining microphone signals, which was well known in the art of beamforming at the time of invention.

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Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler in view of Killion et al as applied to claim 8 above, and further in view of Thompson. The combination of Sessler and Killion does not disclose a matching function. Thompson discloses an apparatus and method for matching the response of microphones. It was suggested to match the response of microphones in directional microphones in hearing aids to improve directional processing. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to use a matching function in the combination of Sessler and Killion for the purpose of improving the hearing aid's performance. As to claim 10, it was obvious to use a processor to combine microphone signals at the time of invention.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler in view of Allen as applied to claim 14 above, and further in view of Thompson. The combination of Sessler and Allen does not disclose a matching function. Thompson discloses an apparatus and method for matching the response of microphones. It was suggested to match the response of microphones in directional microphones in hearing aids to improve directional processing. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to use a matching function in the combination of Sessler and Allen for the purpose of improving the hearing aid's performance. As to claim 19, it was obvious to use a processor to combine microphone signals at the time of invention.

Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler. Sessler discloses a directional microphone comprising transducer 20, cavities 15, 16, tubes 10-13, delay element 30 and summer 31. Tubes 10 and 12 and transducer 20 represent one first-order microphone element, tubes 11 and 13 and transducer 20 represent another first-order

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microphone element. Delay element 30 and summer 31 represent a combining unit to generate a second order microphone system. The finite delay ratio is greater than one for the first order microphone elements because there is an inequality between length between the sound inlet port of tube 10 and the transducer 20 and the length between the sound inlet port of tube 12 and the transducer 20. Sessler does not disclose that the delay ratio is in the range of 1.5 to 3. However, one of ordinary skill in the art would have realized the claimed delay ratio range without undue experimentation in the pursuit of the optimal microphone system for a particular application.

Claims 24, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler in view of Killion. Sessler does not disclose that the combining means comprises delay and subtraction functional units. Killion et al disclose a delay and subtraction technique for combining microphone signals, which was well known in the art of beamforming at the time of invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use delay and subtraction in the apparatus of Sessler for the purpose of creating a second order microphone system. As to claim 26, it was obvious to use a processor to combine microphone signals at the time of invention. Per claim 27, Killion is directed to a hearing aid which is used on the human head.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sessler in view of Thompson. Sessler does not disclose a matching function. Thompson discloses an apparatus and method for matching the response of microphones. It was suggested to match the response of microphones in directional microphones in hearing aids to improve directional processing. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to use

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a matching function in the apparatus of Sessler for the purpose of improving the microphone system's performance.

Claims 30, 31 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller, II. Miller does not disclose that the microphone elements 201, 202 are first-order microphone elements having a delay ratio in the range of 1.5 to 3 or null-less. However, it was well known to match the elements of any microphone array system having a plurality of microphones in order to improve the response to incoming sounds. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to utilize the Miller II apparatus for a system with null-less first order microphone elements. Per claim 35, there is no patentable difference between testing microphone elements together or individually.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (571) 272-7527. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian T. Pendleton
Examiner
Art Unit 2644

